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1. A method of spectroscopic examination of a subject positioned between input and detection ports of a spectroscopic system applied to the subject, said method comprising:

(a) providing multiple input ports placed at selected locations on the subject to probe a selected quality of the subject,

(b) introducing into the subject, at said input ports, electromagnetic non-ionizing radiation of a wavelength selected to be scattered and absorbed while migrating in the subject, said radiation at each of said input ports having a known time-varying pattern of photon density,

(c) the time relationship of said patterns being selected to form resulting radiation that possesses substantial gradient in photon density as a result of the interaction of the introduced patterns emanating from said input ports, said resulting radiation being scattered and absorbed in migration paths in the subject,

(d) detecting over time, at a detection port placed at a selected location on the subject, said radiation that has migrated in the subject,

(e) processing signals of said detected radiation in relation to said introduced radiation to create processed data indicative of the influence of said subject upon said gradient of photon density, and

(f) examining said subject by correlating said processed data with the locations of said input and output ports.

2. The method of claim 1 further comprising

(a) moving synchronously said input ports or said detection port to a different location on a predetermined geometric pattern,

(b) at said different location, further introducing into the subject, at said input ports, electromagnetic non-ionizing radiation of a wavelength selected to be scattered and absorbed while migrating in the subject, said radiation at each of said input ports having a known time-varying pattern of photon density,

(c) the time relationship of said patterns being selected to form resulting radiation that possesses substantial gradient in photon density as a result of the interaction of the introduced patterns emanating from said input ports, said resulting radiation being scattered and absorbed in migration paths in the subject,

(d) detecting over time, at said detection port placed at a selected location on the subject, said further introduced radiation that has migrated in the subject, and

(e) processing signals of said detected further introduced radiation in relation to said introduced radiation to create processed data indicative of the influence of said subject upon said gradient of photon density.

3. A method of spectroscopic examination of a subject positioned between input and detection ports of a spectroscopic system applied to the subject, said method comprising:

(a) providing multiple input ports placed at selected locations on the subject to probe a selected quality of the subject,

(b) introducing into the subject, at said input ports, electromagnetic non-ionizing radiation of a wavelength selected to be scattered and absorbed while migrating in the subject, said radiation at each of said input ports having a known time-varying pattern of photon density,

(c) the time relationship of said patterns being selected to form resulting radiation that possesses substantial gradient in photon density as a result of the interaction of the introduced patterns emanating from said input ports, said resulting radiation being scattered and absorbed in migration paths in the subject,

(d) detecting over time, at a detection port placed at a selected location on the subject, said radiation that has migrated in the subject,

(e) processing signals of said detected radiation in relation to said introduced radiation to create processed data indicative of the influence of said subject upon said gradient of photon density,

(f) moving said detection port to a second location on the subject,

(g) detecting over time, at said detection port placed at said second location on the subject, said radiation that has migrated in the subject,

(h) processing signals of said radiation, detected at second location, in relation to said introduced radiation to create processed data indicative of the influence of said subject upon said gradient of photon density, and

(i) examining said subject by correlating said processed data with the locations of said input and output ports.

4. The method of claim 3 further comprising

(a) moving said detection port to different locations on a predetermined geometric pattern,

(b) detecting over time, at said detection port placed at a selected location on the subject, said radiation that has migrated in the subject, and

(c) processing signals of said radiation, detected at said different locations, in relation to said

introduced radiation to create processed data indicative of the influence of said subject upon said gradient of photon density.

5. The method of claim 2, 3 or 4 wherein said time relationship is further selected to vary the spatial orientation of said gradient of photon density and said movement of said detection port maintains a fixed relationship of said detection port to said varying orientation of said gradient of photon density.

6. A method of spectroscopic examination of a subject positioned between input and detection ports of a spectroscopic system applied to the subject, said method comprising:

(a) providing multiple input ports placed at selected locations on the subject to probe a selected quality of the subject,

(b) introducing into the subject, at said input ports, electromagnetic non-ionizing radiation of a wavelength selected to be scattered and absorbed while migrating in the subject, said radiation at each of said input ports having a known time-varying pattern of photon density,

(c) the time relationship of said patterns being selected to form resulting radiation that possesses substantial gradient in photon density as a result of the interaction of the introduced patterns emanating from said input ports, said resulting radiation being scattered and absorbed in migration paths in the subject,

(d) providing multiple detection ports placed on selected locations on the subject, to probe a selected quality of the subject,

(e) detecting over time, at said detection ports, said radiation that has migrated in the subject,

(f) processing signals of said detected radiation in relation to said introduced radiation to create processed data indicative of the influence of said subject upon said gradient of photon density, and

(f) examining said subject by correlating said processed data with the locations of said input and output ports.

7. The method of claim 6 further comprising

(a) moving at least one said detection port to a different location on a predetermined geometric pattern,

(b) detecting over time, said different location on the subject, radiation that has migrated in the subject, and

(c) processing signals of said radiation, detected at said different location, in relation to said introduced radiation to create processed data indicative of the influence of said subject upon said gradient of photon density.

8. The method of claim 6 wherein said input ports placed on said subject are disposed in array and said method further comprises:

(a) rotating said array of input ports while introducing said radiation into the subject at said input ports,

(b) detecting over time, at said detection ports, said resulting radiation that has migrated in the subject, and

(c) processing signals of said detected radiation in relation to said introduced radiation to create processed data indicative of the influence of said subject upon said gradient of photon density.

9. The method of claim 1, 2, 3, 4, 5, 6, 7 or 8 wherein said subject comprises a constituent that fluoresces, said wavelength of said introduced radiation selected to be absorbed in said fluorescent constituent, said detected radiation is emitted from said fluorescent constituent and processed to determine location of said fluorescent constituent.

10. A method of spectroscopic examination of a subject positioned between input and detection ports of a spectroscopic system applied to the subject, said method comprising:

(a) providing an input port placed at selected locations on the subject to probe a selected quality of the subject,

(b) introducing into the subject, at said input port electromagnetic non-ionizing radiation of a wavelength selected to be scattered and absorbed while migrating in the subject, said radiation having a known time-varying pattern of photon density,

(c) providing multiple detection ports placed on selected locations on the subject, to probe a selected quality of the subject,

(d) detecting over time radiation that has migrated in the subject, the time relationship of said detection over time, at said detection ports, being selected to observe gradient in photon density formed as a result of the interaction of the introduced radiation with the subject,

(e) processing signals of said detected radiation in relation to said introduced radiation to create processed data indicative of the influence of said subject upon said gradient of photon density, and

(f) examining said subject by correlating said processed data with the locations of said input and output ports.

11. The method of claim 10 further comprising

(a) moving said detection ports to a different location on a predetermined geometric pattern,

(b) detecting over time resulting radiation that has migrated in the subject, the time relationship of said detection over time, at said detection ports, being selected to observe gradient in photon density formed as a result of the interaction of the introduced radiation with the subject, and

(c) processing signals of said detected radiation in relation to said introduced radiation to create processed data indicative of the influence of said subject upon said gradient of photon density.

12. A method of spectroscopic examination of a subject positioned between input and detection ports of a spectroscopic system applied to the subject, said method comprising:

(a) providing an input port placed at selected locations on the subject to locate a fluorescent constituent in the subject,

(b) introducing into the subject, at said input port electromagnetic non-ionizing radiation of a wavelength selected to be scattered and absorbed by said constituent while migrating in the subject, said radiation having a known time-varying pattern of photon density,

(c) providing multiplicity of detection ports placed on selected locations on the subject to locate a fluorescent constituent of the subject,

(d) detecting over time fluorescent radiation that has migrated in the subject,

(e) processing signals of said detected radiation in relation to said introduced radiation to create processed data indicative of location of said fluorescent constituent of the subject, and

(f) determining location of said fluorescent constituent of the subject by correlating said processed data with the locations of said input and output ports.

13. The method of claim 12 further comprising

(a) moving said detection ports to a different location on a predetermined geometric pattern,

(b) detecting over time said fluorescent radiation that has migrated in the subject, and

(c) processing signals of said radiation detected at said different location in relation to said introduced radiation to create processed data indicative of location of said fluorescent constituent of the subject.

14. The method of claim 1, 2, 3, 4, 5, 6, 7 or 8 wherein said time-varying pattern comprises radiation of said selected wavelength intensity modulated at a selected frequency, said modulated radiation when introduced from each of said input ports having selected phase relationship that produces in at least one direction a steep phase change and a sharp minimum in the intensity of said radiation.

15. The method of claim 14 wherein said phase relationship is 180 degrees.

16. The method of claim 14 or 15 further comprising a step of imposing on all said introduced radiation patterns an identical time-varying phase

component thereby changing the spatial orientation of said direction of said steep phase change and said sharp minimum in the intensity of said radiation.

17. The method of claim 1, 2, 3, 4, 5, 6, 7 or 8 wherein said time-varying pattern comprises radiation of said selected wavelength intensity modulated at a selected frequency, said modulated radiation when introduced from each of said input ports having selected frequency relationship that produces in at least one direction a steep phase change and a sharp minimum in the intensity of said radiation.

18. The method of claim 1, 2, 3, 4, 5, 6, 7 or 8 wherein said time-varying pattern comprises radiation of said selected wavelength intensity modulated at a selected frequency, said modulated radiation when introduced from each of said input ports having selected amplitude relationship that produces in at least one direction a steep phase change and a sharp minimum in the intensity of said radiation.

19. The method of claim 18 further comprising a step of imposing on all said introduced radiation patterns an identical time-varying amplitude component thereby changing the spatial orientation of said direction of said steep phase change and said sharp minimum in the intensity of said radiation.

20. The method of claim 14, 15, 16, 17, 18 or 19 wherein said radiation is modulated at a frequency that enables resolution of the phase shift that originates during migration of photons in the subject.

21. The method of claim 20 wherein said frequency is on the order of 10^8 Hz.

22. The method of claim 1, 2, 3, 4, 6, 7, 9, 10, 11, 12 or 13 wherein said processing comprises determining the phase or the amplitude of said radiation altered by scattering and absorption in the subject.

23. The method of claim 22 said phase or said amplitude are employed in said examining step to localize a hidden object in said subject.

24. The method of claim 22 said phase or said amplitude are employed in said examining step to image components of said subject.

25. The method of claim 1, 2, 3, 4, 5, 6, 7, 9 or 10 wherein said wavelength of said radiation is susceptible to changes in an endogenous or exogenous tissue pigment of the subject.

26. A system for spectroscopic examination of a subject, positioned between input and detection ports of the spectroscopic system applied to the subject, comprising:

at least one light source adapted to introduce, at multiple input ports, electromagnetic non-ionizing radiation of a known time-varying pattern of photon density and of a wavelength selected to be scattered and absorbed while migrating in the subject, said input ports being placed at selected locations on the subject to probe a selected quality of the subject,

radiation pattern control means adapted to achieve a selected time relationship of said introduced patterns to form resulting radiation that possesses substantial

gradient in photon density as a result of the interaction of the introduced patterns emanating from said input ports, said radiation being scattered and absorbed in migration paths in the subject,

a detector adapted to detect over time, at a detection port placed at a selected location on the subject, said radiation that has migrated in the subject,

processing means adapted to process signals of said detected radiation in relation to said introduced radiation to create processed data indicative of the influence of said subject upon said gradient of photon density, and

evaluation means adapted to examine the subject by correlating said processed data with the locations of said input and output ports.

27. The system of claim 26 further comprising displacement means adapted to move synchronously said optical ports and said detection ports to another location on a predetermined geometric pattern, said other location being used to perform said examination of the subject.

28. A system for spectroscopic examination of a subject, positioned between input and detection ports of the spectroscopic system applied to the subject, comprising:

at least one light source adapted to introduce, at multiple input ports, electromagnetic non-ionizing radiation of a known time-varying pattern of photon density and of a wavelength selected to be scattered and absorbed while migrating in the subject, said input ports being placed at selected locations on the subject to probe a selected quality of the subject,

radiation pattern control means adapted to achieve selected time relationship of said introduced patterns to form resulting radiation that possesses substantial gradient in photon density as a result of the interaction of the introduced patterns emanating from said input ports, said radiation being scattered and absorbed in migration paths in the subject,

a detector adapted to detect over time, at a detection port placed at a selected location on the subject, said radiation that has migrated in the subject,

displacement means adapted to move said detection port to various locations on a predetermined geometric pattern, said various locations being used to detect over time radiation that has migrated in the subject,

processing means adapted to process signals of said detected radiation in relation to said introduced radiation to create processed data indicative of the influence of said subject upon said gradient of photon density, and

evaluation means adapted to examine the subject by correlating said processed data with said locations of said input and output ports.

29. The system of claim 27 or 28 wherein said radiation pattern control means are further adapted to modify said time relationship to vary the spatial orientation of said gradient of photon density and said displacement means further adapted to maintain a fixed relationship of said detection port to said varying orientation of said gradient of photon density.

30. A system for spectroscopic examination of a subject, positioned between input and detection ports of spectroscopic system applied to the subject, comprising:

at least one light source adapted to introduce, at multiple input ports, electromagnetic non-ionizing radiation of a known time-varying pattern of photon density and of a wavelength selected to be scattered and absorbed while migrating in the subject, said input ports being placed at selected locations on the subject to probe a selected quality of the subject,

radiation pattern control means adapted to achieve selected time relationships of said introduced patterns to form resulting radiation that possesses substantial gradients in photon density as a result of the interaction of the introduced patterns emanating from said input ports, said radiation being scattered and absorbed in migration paths in the subject,

at least one detector adapted to detect over time, at multiple detection ports placed at a selected locations on the subject, said radiation that has migrated in the subject,

processing means adapted to process signals of said detected radiation in relation to said introduced radiation to create processed data indicative of the influence of said subject upon said gradient of photon density, and

evaluation means adapted to examine the subject by correlating said processed data with the locations of said input and output ports.

31. The system of claim 30 further comprising displacement means adapted to move at least one of said detection ports to another location on a predetermined geometric pattern, said other location being used to perform said examination of the subject.

32. The system of claim 30 further comprising rotation means adapted to rotate synchronously said

optical input ports while introducing said resulting radiation along a predetermined geometric pattern, said input port rotation being used to perform said examination of a region of the subject.

33. The system of claim 26, 27, 28, 29, 30, 31 or 32 wherein the subject comprises a fluorescent constituent of interest, said wavelength of said introduced radiation is selected to be absorbed in said fluorescent constituent, said detected radiation is emitted from said fluorescent constituent and processed to determine location of said fluorescent constituent.

34. A system for spectroscopic examination of the subject, positioned between input and detection ports of a spectroscopic system applied to the subject, comprising:

a light source adapted to introduce, at an input port, electromagnetic non-ionizing radiation of a known time-varying pattern of photon density and of a wavelength selected to be scattered and absorbed while migrating in the subject, said input port being placed at a selected location on the subject to probe a selected quality of the subject,

detectors adapted to detect over time, at multiple detection ports placed at selected locations on the subject, said radiation that has migrated in the subject, the time relationship of said detection over time, at said detection ports, being selected to observe gradient in photon density formed as a result of the interaction of the introduced radiation with the subject,

processing means adapted to process signals of said detected radiation in relation to said introduced radiation to create processed data indicative of the

influence of said subject upon said gradient of photon density, and

evaluation means adapted to examine said subject by correlating said processed data with the locations of said input and output ports.

35. The system of claim 34 further comprising displacement means adapted to move at least one of said detection ports to another location on a predetermined geometric pattern, said other location being used to perform said examination of the subject.

36. A system for spectroscopic examination of a subject, positioned between input and detection ports of the spectroscopic system applied to the subject, comprising:

a light source adapted to introduce, at an input port, electromagnetic non-ionizing radiation of a known time-varying pattern of photon density and of a wavelength selected to be scattered and absorbed by a fluorescent constituent while migrating in the subject, said input port being placed as a selected location on the subject to locate said fluorescent constituent of the subject,

detectors adapted to detect over time, at multiple detection ports placed at selected locations on the subject, fluorescent radiation that has migrated in the subject,

processing means adapted to process signals of said detected radiation in relation to said introduced radiation to create processed data indicative of location of said fluorescent constituent of the subject, and

evaluation means adapted to examine said subject by correlating said processed data with the locations of said input and output ports.

37. The system of claim 36 further comprising displacement means adapted to move at least one of said detection ports to another location on a predetermined geometric pattern, said other location being used to locate said fluorescent constituent of the subject.

38. The system of claim 26, 27, 27, 29, 30, 31 or 32 wherein said time-varying pattern comprises radiation of a selected wavelength intensity modulated at said selected frequency, and said radiation pattern control means are further adapted to control a selected phase relationship between said modulated radiation patterns introduced from each of said input ports having to produce in at least one direction a steep phase change and a sharp minimum in the intensity of said radiation.

39. The system of claim 38 wherein said phase relationship is 180 degrees.

40. The system of claim 38 or 39 wherein said radiation pattern control means are further adapted to impose on all said introduced radiation patterns an identical time-varying phase component thereby changing the spatial orientation of said direction of said steep phase change and said sharp minimum in the intensity of said radiation.

41. The system of claim 26, 27, 27, 29, 30, 31 or 32 wherein said time-varying pattern comprises radiation of a selected wavelength intensity modulated at said selected frequency, and said radiation pattern control means are further adapted to control a selected frequency relationship between said modulated radiation patterns introduced from each of said input ports having to

produce in at least one direction a steep phase change and a sharp minimum in the intensity of said radiation.

42. The system of claim 26, 27, 27, 29, 30, 31 or 32 wherein said time-varying pattern comprises radiation of a selected wavelength intensity modulated at said selected frequency, and said radiation pattern control means are further adapted to control a selected amplitude relationship between said modulated radiation patterns introduced from each of said input ports having to produce in at least one direction a steep phase change and a sharp minimum in the intensity of said radiation.

43. The system of claim 42 wherein said radiation pattern control means are further adapted to add to all said introduced radiation patterns an identical time-varying amplitude component thereby changing the spatial orientation of said direction of said steep phase change and said sharp minimum in the intensity of said radiation.

44. The system of any one of claims 38 through 43 wherein said radiation is modulated at a frequency that enables resolution of the phase shift that originates during migration of photons in the subject.

45. The system of claim 44 wherein said frequency is on the order of 10^8 Hz.

46. The system of claim 26, 27, 28, 29, 30, 31, 32, 34 or 35 wherein said processing means further adapted to determine the phase or the intensity of said radiation altered by scattering and absorption in the subject.

47. The system of claim 26, 27, 28, 29, 30, 31, 32, 34 or 35 wherein said wavelength of said radiation is susceptible to changes in an endogenous or exogenous tissue pigment of the subject.

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